Space Weather Forecast

Issued on Monday, 07 February 2022 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Possible Coronal Mass Ejection (CME) en-route to Earth. Minor geomagnetic storm likely midweek.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Low over the past 24 hours, with occasional small Common-class X-ray flares observed. The largest of these events was a long-lasting middling common class X-ray flare, peaking at 06/1341UTC. As is often the case with long-duration flares, this was associated with a possible Coronal Mass Ejection (CME), this example from a 'filament eruption' (arc of plasma leaving the sun) emanating from near the middle of the facing side. Given its emission location and the nature of its departure from the sun, this feature has been modelled by MOSWOC as three separate CMEs to provide a best match to available imagery - with two of these fronts mainly angled below the plane of the Earth's orbit, but the third (the innermost and slowest) bearing a likely Earth-bound component.
In terms of remaining activity, there are currently four sunspot regions on the Earth facing side of the Sun, with the region near the northwest limb at the start of the period transiting to the far side. Only minor changes were observed in the other four regions, with the two most noteworthy groups in terms of size both quiet in terms of X-rays, with the 'filament eruption' emanating from the vicinity of a third sunspot group in the southwest.

Solar Wind / Geomagnetic Activity: The solar wind has displayed the effects of a waning negative coronal hole, with elevated wind speeds gradually declining from around 550 km/s to around 500 km/s. The total magnetic field has been weak, with no significant deflections in the important north-south component. Corresponding geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: No solar radiation storms have been observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low in the period, with further Common-class flares and a chance of Moderate-class flares.

Solar Wind / Geomagnetic Activity: The current fast solar wind regime is likely to be the peak persistent feature in the four-day period, and is now expected to gradually wane. There is then the consideration of the possible arrival of the 06 February CME, which has been modelled and offers a likely arrival on day 3 (9th), with a Minor Geomagnetic Storm likely and perhaps continuing into day 4 (10th). There is an accompanying slight chance of a Moderate Storm, with this not the favoured scenario but most probable near onset should it occur.

Energetic Particles / Solar Radiation: Solar radiation storms carry a daily slight chance of rising close to or just above the S1 level given any significant moderate-class X-ray flaring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	60	40
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	25	25
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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